Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method comprising:

receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state, wherein the desired end state indicates an operational state associated with a component to be achieved by the autonomic computing system by utilizing one or more resources in the set of resources without violating relationship specifications associated with the set of resources, and wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein the availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources;

discovering a set of implicit relationships associated with at least the set of resources, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

determining, in response to the receiving, policy definitions associated with the set of resources for achieving the desired end state associated with the autonomic computing system, wherein the policy definitions are determined based on the set of resource relationships received from the user and the implicit relationships that have been discovered, and wherein the policy definitions define at least one of operational policies indicating how to operate the set of resources and selection policies indicating how to select resources in the set of resources to achieve the desired end state;

generating a system-wide directed graph, based on at least the set of resource relationships received from the user, the implicit relationships that have been discovered, and the policy definitions that have been determined that specifies a set of interrelations between the set of resources;

monitoring applicable each resource in the set of resources for status information associated with each resource, wherein the status information indicates a resource associated with the status information has achieved a desired end state associated with the resource, wherein the desired end state of the resource indicates at least an operational state of the resource to be achieved by the autonomic computing system in order to achieve the desired end state of the autonomic computing system;

determining, based on the monitoring, if the autonomic computing system is at the desired end state, wherein the autonomic computing system is at the desired end state if each resource in the set of resources being utilized by the autonomic computing system to achieve the desired end state has achieved their own desired end states; and

dynamically modifying resource states, in response to determining the autonomic computing system is not at the desired end state, by sending an instruction for at least one resource to perform an available action based on the policy definitions and the system-wide directed graph, wherein the available action is at least one of

come on-line,

go off-line,

reset, and

a combination thereof,

and wherein the at least one resource is at least one of a resource in the set of resources and a new resource identified in the system-wide directed graph , in response to determining the autonomic computing system is not at the desired end state.

2. (Previously Presented) The method of claim 1, wherein the policy definitions can specify at least one of:

an association between a resource and any other set of resources for achieving the desired end state ; and

a desired state for a resource or set of resources for achieving the desired end state.

3. (Original)   The method of claim 2, wherein the association between a resource and any other set of resources comprise at least one of:

a start order among resources;

a stop order among resources;

a prioritization between resources;

a conditional activation of policies; and

a location limitation of resources.

4. (Previously Presented) The method of claim 1, further comprising:

receiving resource status information from available resources; and

continuing to determine if the autonomic computing system is at the desired end state and modifying the resource states, by sending an instruction for at least one resource to perform an available action based on the policy definitions, until the autonomic computing system has reached the desired end state.

5. (Canceled)

6. (Currently Amended) The method of claim 1, wherein the discovering a set of implicit relationships further comprises:

real-time harvesting of implicit relationships between resources through self discovery as new resources are detected within the autonomic computing system.

7. (Previously Presented) The method of claim 1, wherein the determining policy definitions for an autonomic computing system further comprises determining underlying relationships among members of a resource group defined by the user.

8. (Original)   The method according to claim 7, wherein the members of the resource group are distributed within a heterogeneous cluster.

9. (Currently Amended)   A computer readable storage product comprising computer instructions for performing the following:

receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state, wherein the desired end state indicates an operational state associated with a component to be achieved by the autonomic computing system by utilizing one or more resources in the set of resources without violating relationship specifications associated with the set of resources, and wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein the availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources;

discovering a set of implicit relationships associated with at least the set of resources, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

determining, in response to the receiving, policy definitions associated with the set of resources for achieving the desired end state associated with the autonomic computing system, wherein the policy definitions are determined based on the set of resource relationships received from the user and the implicit relationships that have been discovered, and wherein the policy definitions define at least one of operational policies indicating how to operate the set of

resources and selection policies indicating how to select resources in the set of resources to achieve the desired end state;

generating a system-wide directed graph, based on at least the set of resource relationships received from the user, the implicit relationships that have been discovered, and the policy definitions that have been determined that specifies a set of interrelations between the set of resources;

monitoring ~~applicable~~ each resource in the set of resources for status information associated with each resource, wherein the status information indicates a resource associated with the status information has achieved a desired end state associated with the resource, wherein the desired end state of the resource indicates at least an operational state of the resource to be achieved by the autonomic computing system in order to achieve the desired end state of the autonomic computing system;

determining, based on the monitoring, if the autonomic computing system is at the desired end state, wherein the autonomic computing system is at the desired end state if each resource in the set of resources being utilized by the autonomic computing system to achieve the desired end state has achieved their own desired end states; and

dynamically modifying resource states, in response to determining the autonomic computing system is not at the desired end state, by sending an instruction for at least one resource to perform an available action based on the policy definitions and the system-wide directed graph, wherein the available action is at least one of

come on-line,

go off-line,

reset, and

a combination thereof,

and wherein the at least one resource is at least one of a resource in the set of resources and a new resource identified in the system-wide directed graph ~~, in response to determining the autonomic computing system is not at the desired end state~~.

10. (Previously Presented)   The computer readable storage product of claim 9, wherein the policy definitions can specify at least one of:

an association between a resource and any other set of resources for achieving the desired end state ; and

a desired state for a resource or set of resources for achieving the desired end state.

11. (Previously Presented)   The computer readable storage product of claim 10, wherein the association between a resource and any other set of resources comprise at least one of:

a start order among resources;

a stop order among resources;

a prioritization between resources;

a conditional activation of policies; and

a location limitation of resources.

12. (Previously Presented)   The computer readable storage product of claim 9, further comprising computer instructions for performing the following:

receiving resource status information from available resources; and

continuing to determine if the autonomic computing system is at the desired end state and modifying the resource states, by sending an instruction for at least one resource to perform an available action based on the policy definitions, until the autonomic computing system has reached the desired end state.

13. (Canceled)

14. (Currently Amended)   The computer readable storage product of claim 9, wherein the discovering a set of implicit relationships further comprises:

  real-time harvesting of implicit relationships between resources through self discovery <u>as new resources are detected within the autonomic computing system</u>.

15. (Previously Presented)   The computer readable storage product of claim 9, wherein the determining policy definitions for an autonomic computing system further comprises determining underlying relationships among members of a resource group defined by the user.

16. (Previously Presented) The computer readable storage product according to claim 15, wherein the members of the resource group are distributed within a heterogeneous cluster.

Claims 17-24 (Canceled)

25. (New) An autonomic computing system resource manager comprising:

      memory for storing at least one policy definition;

      a user interface communicatively coupled to at least the memory for receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state, wherein the desired end state indicates an operational state associated with a component to be achieved by the autonomic computing system by utilizing one or more resources in the set of resources without violating relationship specifications associated with the set of resources, and wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein the availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources;

      a resource harvester communicatively coupled to at least the memory for discovering a set of implicit relationships associated with at least the set of resources, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

      a policy generator communicatively coupled to at least the memory and the resource harvester for determining, in response to a receiving a desired end state and a set of resource relationship, policy definitions associated with the set of resources for achieving the desired end state associated with the autonomic computing system, wherein the policy definitions are determined based on the set of resource relationships received from the user and the implicit relationships that have been discovered, and wherein the policy definitions define at least one of operational policies indicating how to operate the set of resources and selection policies

indicating how to select resources in the set of resources to achieve the desired end state, wherein the policy generator further

generates a system-wide directed graph, based on at least the set of resource relationships received from the user, the implicit relationships that have been discovered, and the policy definitions that have been determined that specifies a set of interrelations between the set of resources;

a resource monitor communicatively coupled to at least the set of resources for monitoring each resource in the set of resources for status information associated with each resource, wherein the status information indicates a resource associated with the status information has achieved a desired end state associated with the resource, wherein the desired end state of the resource indicates at least an operational state of the resource to be achieved by the autonomic computing system in order to achieve the desired end state of the autonomic computing system;

an automation engine; communicatively coupled to the resource monitor and the memory, for determining, based on monitoring each resource in the set of resources, if the autonomic computing system is at the desired end state, wherein the autonomic computing system is at the desired end state if each resource in the set of resources being utilized by the autonomic computing system to achieve the desired end state has achieved their own desired end states; and

dynamically modifying resource states, in response to determining the autonomic computing system is not at the desired end state, by sending an instruction for at least one resource to perform an available action based on the policy definitions and the system-wide directed graph, wherein the available action is at least one of

come on-line,

go off-line,

reset, and

a combination thereof,

and wherein the at least one resource is at least one of a resource in the set of resources and a new resource identified in the system-wide directed graph.

26. (New) The autonomic computing system resource manager of claim 25, wherein the policy definitions can specify at least one of:

an association between a resource and any other set of resources for achieving the desired end state ; and

a desired state for a resource or set of resources for achieving the desired end state.

27. (New) The autonomic computing system resource manager of claim 26, wherein the association between a resource and any other set of resources comprise at least one of:

a start order among resources;

a stop order among resources;

a prioritization between resources;

a conditional activation of policies; and

a location limitation of resources.

28. (New) The autonomic computing system resource manager of claim 25, wherein the resource monitor further:

receives resource status information from available resources; and
wherein the automation engine

continues to determine if the autonomic computing system is at the desired end state and modifying the resource states, by sending an instruction for at least one resource to perform an available action based on the policy definitions, until the autonomic computing system has reached the desired end state.

29. (New) The autonomic computing system resource manager of claim 25, wherein the discovering a set of implicit relationships further comprises:

real-time harvesting of implicit relationships between resources through self discovery as new resources are detected within the autonomic computing system.

30. (New) The autonomic computing system resource manager of claim 25, wherein determining policy definitions for an autonomic computing system further comprises:

determining underlying relationships among members of a resource group defined by the user.

31. (New)   An apparatus comprising:

a cluster resource manager for:

receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state, wherein the desired end state indicates an operational state associated with a component to be achieved by the autonomic computing system by utilizing one or more resources in the set of resources without violating relationship specifications associated with the set of resources, and wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein the availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources;

discovering a set of implicit relationships associated with at least the set of resources, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

determining, in response to the receiving, policy definitions associated with the set of resources for achieving the desired end state associated with the autonomic computing system, wherein the policy definitions are determined based on the set of resource relationships received from the user and the implicit relationships that have been

discovered, and wherein the policy definitions define at least one of operational policies indicating how to operate the set of resources and selection policies indicating how to select resources in the set of resources to achieve the desired end state;

generating a system-wide directed graph, based on at least the set of resource relationships received from the user, the implicit relationships that have been discovered, and the policy definitions that have been determined that specifies a set of interrelations between the set of resources;

monitoring each resource in the set of resources for status information associated with each resource, wherein the status information indicates a resource associated with the status information has achieved a desired end state associated with the resource, wherein the desired end state of the resource indicates at least an operational state of the resource to be achieved by the autonomic computing system in order to achieve the desired end state of the autonomic computing system;

determining, based on the monitoring, if the autonomic computing system is at the desired end state, wherein the autonomic computing system is at the desired end state if each resource in the set of resources being utilized by the autonomic computing system to achieve the desired end state has achieved their own desired end states; and

dynamically modifying resource states, in response to determining the autonomic computing system is not at the desired end state, by sending an instruction for at least one resource to perform an available action based on the policy definitions and the system-wide directed graph, wherein the available action is at least one of

come on-line,

go off-line,

reset, and

a combination thereof,

and wherein the at least one resource is at least one of a resource in the set of resources and a new resource identified in the system-wide directed graph; and

at least one network interface card, communicatively coupled with the cluster resource manager and set of resources, for communicating information between the cluster resource manager and set of resources in the autonomic computing system.

32. (New)   An autonomic computing system comprising:

at set of distributed resources; and

an autonomic computing system resource manager comprising:

memory for storing at least one policy definition;

a user interface communicatively coupled to at least the memory for receiving, from a user, a desired end state associated with an autonomic computing system and a set of resource relationships associated with a set of resources for accomplishing the desired end state, wherein the desired end state indicates an operational state associated with a component to be achieved by the autonomic computing system by utilizing one or more resources in the set of resources without violating relationship specifications associated with the set of resources, and wherein the set of resource relationships received from the user only specify relationships associated with a top-most level set of resources in the set of resources, wherein the availability of one or more of the top-most level set of resources is dependent on the availability of one or more resources of a lower level set of resources in a reverse hierarchy of dependencies from top-most level to lowest level set of resources;

a resource harvester communicatively coupled to at least the memory for discovering a set of implicit relationships associated with at least the set of resources, wherein the set of implicit relationships at least indicate one or more of a set of resource dependencies for at least one resource in the set of resources and location requirements for at least one resource in the set of resources, and wherein the set of implicit relationships are discovered automatically without the user explicitly specifying the implicit relationships, wherein the set of implicit relationships are relationships associated from the top-most level set of resources to a lower level set of resources in the set of resources;

a policy generator communicatively coupled to at least the memory and the resource harvester for determining, in response to a receiving a desired end state and a set of resource relationship, policy definitions associated with the set of resources for achieving the desired end state associated with the autonomic computing system, wherein the policy definitions are determined based on the set of resource relationships received from the user and the implicit relationships that have been discovered, and wherein the

policy definitions define at least one of operational policies indicating how to operate the set of resources and selection policies indicating how to select resources in the set of resources to achieve the desired end state, wherein the policy generator further generates a system-wide directed graph, based on at least the set of resource relationships received from the user, the implicit relationships that have been discovered, and the policy definitions that have been determined that specifies a set of interrelations between the set of resources;

a resource monitor communicatively coupled to at least the set of resources for monitoring each resource in the set of resources for status information associated with each resource, wherein the status information indicates a resource associated with the status information has achieved a desired end state associated with the resource, wherein the desired end state of the resource indicates at least an operational state of the resource to be achieved by the autonomic computing system in order to achieve the desired end state of the autonomic computing system;

an automation engine; communicatively coupled to the resource monitor and the memory, for determining, based on monitoring each resource in the set of resources, if the autonomic computing system is at the desired end state, wherein the autonomic computing system is at the desired end state if each resource in the set of resources being utilized by the autonomic computing system to achieve the desired end state has achieved their own desired end states; and

dynamically modifying resource states, in response to determining the autonomic computing system is not at the desired end state, by sending an instruction for at least one resource to perform an available action based on the policy definitions and the system-wide directed graph, wherein the available action is at least one of

come on-line,

go off-line,

reset, and

a combination thereof,

and wherein the at least one resource is at least one of a resource in the set of resources and a new resource identified in the system-wide directed graph.